

WHAT IS CLAIMED IS:

1. A reformer for obtaining a synthesis gas by partially oxidizing a carbon-containing raw material and then steam-reforming the oxidized raw material,

the reformer comprising:

5 a reactor vessel,

an oxidizing agent feed pipe for feeding an oxidizing agent into the vessel, and

a carbon-containing raw material feed pipe for feeding the carbon-containing raw material into the vessel,

10 wherein the central axis of the oxidizing agent feed pipe and the central axis of the carbon-containing raw material feed pipe intersect with each other downstream of the outlet of the oxidizing agent feed pipe in an oxidizing agent flowing direction and downstream of the outlet of the carbon-containing raw material feed pipe in a carbon-containing raw material flowing direction.

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2. The reformer according to Claim 1, wherein the central axis of the oxidizing agent feed pipe and the central axis of the carbon-containing raw material feed pipe intersect with each other at an angle of 80 to 100°.

3. The reformer according to Claim 1, wherein the following relationships are satisfied:

$$40 \leq V1 \leq 150 ;$$

$$0.2V1 \leq V2 \leq 0.8V1 ; \text{ and}$$

5 $\min(0.5D2, 7.0D1) \leq L1 \leq \max(0.5D2, 7.0D1),$

wherein D1 (m) is an equivalent hydraulic diameter of the outlet of the oxidizing agent feed pipe,

D2 (m) is an equivalent hydraulic diameter of the outlet of the carbon-containing raw material feed pipe,

10 V1 (m/sec) is an average flow velocity of oxidizing agent jet at the outlet of the oxidizing agent feed pipe,

V2 (m/sec) is an average flow velocity of carbon-containing raw material jet at the outlet of the carbon-containing raw material feed pipe, and

15 L1 (m) is a distance from the outlet-end of the oxidizing agent feed pipe to an intersection point where the central axis of the oxidizing agent feed pipe and the central axis of the carbon-containing raw material feed pipe intersect with each other.

4. The reformer according to Claim 1, wherein the cross section of the outlet of the oxidizing agent feed pipe has a circular, oval, polygonal, starry or petal shape.